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ABSTRACT

This report summarizes the Specialized Teacher Project of the Miller Mathematics Improvement Program funded by the state of California. The project provides inservice training workshops in mathematics for elementary school teachers. These teachers are then encouraged to provide specialist instruction in mathematics for their own class and one other class at the same grade level by means of a trade-off of teaching assignments. The objectives and procedures for these workshops are included, and three phases of the 1969-1970 research are reported. Phase One examines the cost effectiveness of varying the instructor participant ratios in the workshops. Phase Two compares the achievement of classes for different socio-economic levels of the communities involved. Phase Three compares pupil achievement of classes taught by teachers who commuted to workshops with those taught by teachers who resided on campus during the workshops. Results of the three analyses are reported. Teacher training had a positive effect on pupil achievement in mathematics, particularly in grade two in low socio-economic areas. For a related document, see ED 047 950. (JH)

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RESEARCH REPORT

OF THE

SPECIALIZED TEACHER PROJECT

1969-1970

One of the
Mathematics Improvement Programs
Authorized by
California Education Code Section 5799

California State Department of Education

June 1971

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INTRODUCTION

The California State Department of Education's consultant in mathematics, Mrs. Bryne Bessie Frank, has written a summary of the Specialized Teacher Project. This summary serves as an excellent introduction for this report as it describes the past, present, and future plans of the Specialized Teacher Project. We are grateful to Mrs. Frank for allowing us to reproduce the summary.

February 2, 1971

Summary Report
of the
SPECIALIZED TEACHER PROJECT
One of the
MILLER MATHEMATICS IMPROVEMENT PROGRAMS
By
Bryne Bessie Frank

BACKGROUND

The Specialized Teacher Project is one of four Mathematics Improvement Programs established by the 1967 session of the California State Legislature. Authored by the late Senator George Miller, Jr., the legislation, incorporated in California Education Code Section 5799, provides ways of strengthening mathematics instruction in the State's elementary and secondary public schools. It authorizes the development of a test and establishes three pilot projects to begin in 1968. The Specialized Teacher Project, originally authorized as a three-year pilot project, has been extended by 1970 legislation for an additional three years until 1973-74.

DESCRIPTION

The Specialized Teacher Project provides state funds for ten-day summer inservice training workshops in mathematics for elementary school teachers. These teachers are encouraged subsequently to provide instruction in mathematics for pupils in their own and one other class at the same grade level by means of a trade-off or exchange of teaching assignments.

The summer training stresses individualized learning experiences, the techniques employed in using mathematical possibilities in the environment and physical materials in a mathematics laboratory setting. The philosophy of education reflected is similar to Madison Project (Robert Davis, Syracuse University), The Nuffield Mathematics Project of Great Britain, and many other projects in the United States and abroad which rely on an active learning approach. The Specialized Teacher Project is operated by the Office of the San Diego County Superintendent of Schools under terms of a contract with the California State Department of Education.

PARTICIPATION AND EVALUATION

In 1968 summer training was given to 130 second and fifth grade teachers from 48 districts. Results of pre- and post-testing of pupils in their experimental and comparison classes showed that the teacher training had a very strong effect on pupils' mathematical achievement in grade two, particularly on those pupils from low socio-economic areas.

In grade five, the effect was more limited with achievement gains significant in certain new topics introduced in the summer training.

In 1969, 858 teachers from 336 districts received summer training including 87 "second year" participants. An analysis of the results of pre- and post-testing during the 1969-70 school year revealed that pupils whose teachers received in-service training scored significantly higher on measures of comprehension and computation. Again, the project was particularly effective with pupils from low socio-economic areas. Both second and fifth grade pupils made significant gains on nine of the ten scales measured. When the trade-off feature of the project is employed, the number of pupils who profit from the project naturally is doubled.

In the summer of 1970, 1136 teachers of grades two, three, five, and six, representing 343 districts, received training. Of these, 180 teachers who had attended previous workshops received three weeks of leadership training. Pre-tests were given to pupils in October 1970 and post-tests will be given in May 1971.

For the summer of 1971, there will be opportunities for 1200 teachers, grades one through six. The faculty for the workshops will be responsible for about 30 interns who have demonstrated leadership potential in previous summers. Additionally, and at district expense, opportunities for training will be extended to about 150 supervisors and administrators.

FUNDING

All costs for training teachers are borne by the State including stipends, travel and living expenses, and instructional materials which become the property of the district and are to be used by the specialized teacher in the classroom. All expenses incurred for training supervisors and administrators including the cost of instructional materials, shall be borne by the districts.

All inquiries about the project should be directed either to Leonard M. Warren, Director, Specialized Teacher Project, 6401 Linda Vista Road, San Diego CA 92111, or Mrs. Bryne Bessie Frank, Consultant in Mathematics, Bureau of Elementary and Secondary Education, State Department of Educatior Sacramento CA 95814.

RESEARCH DESIGN

Definition of Terms

"Participants" are those classroom teachers who attended the workshops.

"Teachers" are those classroom teachers who did not attend the workshops, but whose classes were used as research controls.

"Workshops" and "inservice programs" are used synonymously.

"Instructors" are those persons who conducted the workshop classes.

As outlined in Mrs. Frank's summary, the 1968-69 Research Study of the Specialized Teacher Project demonstrated that an inservice training program for mathematics teachers can significantly improve pupil achievement in mathematics. The 1969-70 research built upon and added to the preceding year's study in three phases. The first phase of the 1969-70 study was directed toward determining cost effectiveness by means of varying the instructor-participant ratios of the 1968-69 inservice program. Five separate inservice program formats were studied, each with its appropriate control class whose teachers did not attend the workshop (VI).

(I) One-week workshop in a single district followed by five Saturday workshops at two-week intervals during the fall. Instructor-participant ratio, 2-20.

(II) Two-week workshop for second-year participants. Instructor-participant ratio, 2-20.

(III) Two-week workshop for first-year participants. Instructor-participant ratio, 2-20.

(IV) Two-week workshop for first-year participants. Instructor-participant ratio, 2-32.

(V) Two-week workshop for first-year participants. Instructor-participant ratio, 4-150.

The second phase of the 1969-70 study was made by dividing the classes according to the socioeconomic level of the community designated as low, medium, or high. The third phase of the study compared pupil achievement of classes taught by participants who commuted each day to a workshop to pupil achievement of participants who resided on campus.

Testing Program

A battery of tests covering concept understanding, computational ability, and attitudes towards mathematics was administered in the fall shortly after the beginning of instruction. A similar battery was administered near the end of the school year.

In grade 2 the battery consisted of basic tests of mathematical comprehension and computational ability. Each of the concept and computational tests was modified by removing some of the elementary questions and substituting more advanced questions to provide the battery for the spring testing program. In grade 5 selected scales from the National Longitudinal Study of Mathematics Achievement (NLSMA) series of tests were used for both the fall and end-of-year testing programs. These tests covered understanding as well as computational ability in the areas of whole number operations, operations with fractions, and informal geometric ideas. A special achievement test covering graphs, functions, and probability was administered in the spring. These particular areas had been emphasized in the inservice training and in the instructional program for the fifth grade. In grade 5 a selected set of attitude scales was also administered in both the fall and spring testing programs.

A list of the test scales is given in Appendix B.

FINDINGS AND CONCLUSIONS

The research design of the study and the methods of statistical analysis are discussed in the following section of this report. The basic data of the statistical analysis are presented in the tables of Appendix A. The general conclusions of the study are summarized in this section.

(1) The data for 1969-70 support and strengthen the finding from the 1968-69 study that the inservice program provided to participants the two-week workshops had a positive effect on the mathematics achievement of their pupils. The data also confirm the 1968-69 finding that the inservice program is more effective in grade 2 than in grade 5. (Tables 1, 4, 7, 9.)

(2) In grade 2 the two-week inservice programs were most effective in increasing the pupils' understanding of mathematics. The classes taught by participants in the inservice program had scores on the second level comprehension scale which were nearly 20 percent higher than the scores of the control classes. The classes scored only 2 percent higher on the computation scales. (Table 1.)

(3) In grade 5 the two-week inservice programs produced significantly better pupil performance in several areas of mathematics achievement, although the effects were not large. The participants' classes had scores about 5 percent higher than the control classes. There were no overall significant differences in performance on any of the attitude tests scales. (Table 7.)

(4) The different instructor-to-participant ratios did not produce measurable differences in pupil performance. (Tables 3, 8.)

(5) In the school district where the inservice education was organized as a one-week summer workshop followed by five Saturday workshops at two-week intervals during the fall, the classes did not perform as well as did the classes under the two-week inservice plans. In fact, the overall performance of these classes was below that of the control classes. It is not clear that this indicates a weakness of the organizational plan since there may have been other factors present in the particular district responsible for the observed results. However, this organization plan is being implemented in another school district for the 1970-71 research to clarify this point. (Tables 1, 2, 7, 8.)

(6) The experimental classes and their controls were also classified according to three socioeconomic levels. In general, the differences between the

experimental and control classes were most marked for the medium and low socioeconomic groups. Except for a few scales, the difference was largest for the low socioeconomic group. Hence the 1969-70 study supports the finding of the 1968-69 study that the inservice training is particularly effective for classes in disadvantaged areas. This analysis was one of the few which showed an appreciable difference on some attitude scales. There was a highly significant difference between the socioeconomic groups in response to the scale measuring attitude toward arithmetic, fun versus dull. Furthermore, the inservice classes from the low socioeconomic group had the highest adjusted score on this scale. This affords some objective evidence that the inservice education had a positive effect on the attitude of the pupils toward mathematics (Tables 4, 9.)

(7) In two of the inservice groups, the teachers were about equally divided between those who commuted each day to the workshop and those who lived at the workshop center. Since this factor has a bearing on the cost of operating a workshop, the data were analyzed to determine what effect this factor might have on student achievement. No significant differences were found between the classes taught by the commuting and non-commuting teachers in both grade 2 and grade 5. (Tables 5, 10.)

Statistical Analysis

The class means for each of the fall and spring test scales constituted the basic statistical data of the study. The effect of each of the factors was determined by means of analysis of covariance. The fall scores were covariates while the spring scores served as independent variables. The analysis provided mean cell scores for each dependent variable adjusted on the basis of regression on the fall scores. In this way the analysis compensated for the differences which existed between classes at the beginning of the school year.

The following analyses were made for both grade levels:

1. One-way analysis for inservice categories I, II, III, IV, V, VI
2. One-way analysis for inservice categories I, II, III, IV, V
3. One-way analysis for inservice categories II, III, IV, V
4. Two-way analysis with two categories of inservice (two-week workshop, no inservice) and three socioeconomic levels
5. Two-way analysis with two categories of inservice (III, IV) and two levels of the commuting factor.

The cell sizes (number of classes) were as follows:

TABLE 1

Inservice

	I	II	III	IV	V	VI
Grade 2	16	22	14	32	174	259
Grade 5	20	25	15	37	192	289

TABLE 2

Socioeconomic

	High		Medium		Low	
	Inservice	Control	Inservice	Control	Inservice	Control
Grade 2	21	21	188	200	33	38
Grade 5	29	30	216	231	24	28

TABLE 3

Commuting Factor

	Commuting		Non-commuting	
	III	IV	III	IV
Grade 2	6	21	8	11
Grade 5	10	23	5	14

The tables of adjusted mean scores with the associated F-values are given in Appendix A.

INSERVICE PROGRAM

The objectives of the inservice workshops were:

. . . . . to provide an open atmosphere in which participants could learn to use more effectively the mathematics materials presently in the classroom.

. . . . . to explore with participants the implications of the 1967-68 Strands Report of the Statewide Mathematics Advisory Committee.

. . . . . to teach the participants more mathematics than they had classroom need for in a setting that applied it directly to the teaching situation.

. . . . . to use the methodologies of the Madison Project and the Nuffield Program, which put emphasis on laboratory approaches, intuition, and child development.

. . . . . to bring out the theories of Piaget.

. . . . . to develop better participants who could in turn develop better pupils.

. . . . . to develop an inservice format that accommodates the maximum number of participants at a minimum cost without sacrificing the quality of the workshops' procedures.

. . . . . to teach participants in the same way they are expected to teach pupils.

. . . . . to use master classroom teachers where possible as the project instructors.

. . . . . to implement the 1967-68 Strands Report of the Statewide Mathematics Advisory Committee.

. . . . . to use an eclectic approach with existing materials, not to create new ones.

. . . . . to develop a corps of experienced leaders for mathematics education in the State.

. . . . . to involve children in the workshops' demonstration lessons.

. . . . . to allow participants to learn with children.

. . . . . to encourage participants to work with pupils on an individualized basis and in small groups.

. . . . . to effect a positive attitude change toward mathematics in the pupils.

. . . . . to relate mathematics to the real world and the pupils' immediate environment.

. . . . . to demonstrate the open-endedness of mathematics.

. . . . . to create the responsibility for one's own learning; intrinsic motivation, self direction.

. . . . . to allow participants a "hands-on" workshop experience where a major amount of time is devoted to participant involvement through discovery lessons, construction of materials, laboratory experiences consisting of manipulative aids, gaming techniques, and a low-pressure environment.

. . . . . to allow for "incorrect" responses as a means of finding correct solutions.

. . . . . to allow for as many success experiences as possible.

. . . . . to achieve a greater amount of meaningful verbalization among the participants in place of stand-up lecturing by the instructor.

. . . . . to articulate the mathematical content among the grades and be aware of cognitive levels.

. . . . . to integrate the lessons of the workshop with the State-adopted textbook.

Inservice Formats

I. Two instructors with 20 first-year participants representing all elementary schools in one district.

This format was implemented in one school district where there were trained participants in every school. The format included both a grade 2 and a grade 5 participant from each school. Approaches that could have been used in this format that were not so readily applicable to the other in-service formats were:

A. the "buddy system" – the two participants from each building had the opportunity to share experiences.

B. all of the participants from each of the schools could have formed a committee to share ideas.

C. a different training period as the participants met every day for one week before school opened in the fall with five Saturday follow-up sessions after school opened.

II. Two instructors with 20 second-year participants. These sections were designed to find out if a second year of training would cause a greater increase in pupil achievement than one year of training. (This was not a

two-year longevity study as the participants taught different children the second year.)

III. Two instructors with 20 first-year participants. These sections were designed as a comparison with the first year's format to see if the results would be the same. Demonstration classes of children were available for trying out various lessons learned by the participants.

IV. Two instructors with 32 first-year participants. These sections were designed to see whether a larger ratio between instructors and participants would affect pupil achievement.

V. Four instructors with 150 first-year participants. These sections further increased the instructor-participants ratio. Team and cooperative teaching organizations were used. A set of five one-half hour video tapes were especially designed for these sections.

Workshop Staffs

Because of the emphasis on improving classroom performance of participants and because of previous success with Madison Project workshops, experienced teachers who had had previous inservice training responsibilities were selected as instructors for the workshops. As was discovered later, this feature of the workshop was greatly appreciated by the participants because they were able to develop rapport with their instructors quite easily.

Instructors selected for the grade 2 participants were:

Mrs. Janet Abbott, Supervisor, Chula Vista School District
Mr. William Aho, Supervisor, Walnut Creek School District
Mrs. Francis Burns, Teacher, Escondido School District
Mrs. Mary Dahle, Teacher, Los Angeles City Schools
Mrs. Sarah Golden, Teacher, Chula Vista School District
Mr. Samuel Lipman, Resource Teacher, Cajon Valley School District
Mrs. Marion Pasternak, Teacher, Los Angeles City Schools
Mr. Jerry Regnier, Teacher, Los Angeles City Schools
Miss Marilyn Rehwald, Teacher, Los Angeles City Schools
Mr. George Wright, Principal, Chula Vista School District

Instructors selected for the grade 5 participants were:

Mrs. Joan Akers, Teacher, Santee School District
Mr. George Arbogast, Principal, Los Angeles City Schools
Mr. James Burton, Teacher, Oceanside School District
Mr. Edward Fecko, Teacher, Rancho Santa Fe School District
Mr. Bonnie Rae James, Teacher, Los Angeles City Schools
Mrs. Gail Lowe, Teacher, Los Angeles City Schools

Mr. John Otterness, Mathematics Specialist, Los Angeles City Schools
Mrs. Audrey Oyer, Teacher, Lemon Grove School District
Mr. George Vojtko, District Resource Teacher, San Diego Unified School District
Mr. Charles Wilbur, Teacher, Los Angeles City Schools
Mr. Alberto Beron, Teacher, Los Angeles City Schools

Selection of Participants

General guidelines for the Specialized Teacher Project were sent from the State Department of Education in March 1969 to all county superintendents of schools, elementary school district superintendents, and elementary school principals in the State. Districts were invited to submit applications for pairs of teachers for the project. (One teacher became the workshop participant and the other became the control teacher for the research design.) From these applicants, random, arbitrary assignments were made to the various inservice formats. Geographical representation was effected through involvement of participants from 336 districts. From these districts 858 teachers were selected for inservice workshops at three locations in the State — Long Beach, Hayward, and Norwalk. The list of school districts and participants is given in Appendix C.

Workshop Schedule and Activities

In order that the three workshops be as much alike as possible, careful planning by the staff was necessary. This was accomplished by one week of planning prior to the first workshop. Lesson plans for the two-week workshops were based on the objectives of the workshop and were followed for each workshop. Analysis and evaluation of the materials and the concepts led to careful structuring of the all-workshop days yet allowed a great deal of flexibility within the classrooms. Separate classes geared to second or fifth grade were set up. The daily schedule for the classes was developed as follows:

8:30 - 9:30	Instruction
9:30 - 10:00	Break
10:00 - 11:00	Instruction
11:00 - 12:00	Instruction
12:00 - 1:00	Lunch
1:00 - 2:00	Instruction
2:00 - 2:30	Break
2:30 - 3:30	Instruction
3:30 - 4:30	Staff Meeting

The daily staff meeting created a reporting system which gave immediate feedback on means of implementation of the original lesson plans developed during the planning week.

Follow-up Activity

A follow-up session was held for the workshop participants during the month of February. The main objectives of the session were to answer questions of the participants and to reinforce the concepts taught during the summer. The exchange of ideas that occurred during the question period was beneficial. Problem area topics had been solicited from the teachers in advance.

FINANCIAL CONSIDERATIONS

One of the major determinations to be made was a cost effectiveness study of each of the inservice formats. This study was somewhat simplified by the fact that the performance of the inservice classes was relatively the same for four of the five formats. Therefore, a comparison can be made simply on the costs for each format.

Inservice Format Costs

Instructor/Participant Ratios

I. 2/20 all one district
II. 2/20 second-year
III. 2/20 first-year participants
IV. 2/32 first-year participants
V. 4/150 first-year participants

TABLE 4

Total Number of Participants

	I	II	III	IV	V	Totals
Long Beach	--	56	38	56	280	430
Hayward	--	31	--	53	288	372
Norwalk	56	--	--	--	---	56
TOTALS	56	87	38	109	568	858
Cost/format	$ 17,952	$ 29,154	$ 13,092	$ 35,094	$ 176,016	
Cost/partcpt	$ 321	$ 335	$ 345	$ 322	$ 310	

RECOMMENDATIONS

It can be determined that the large group, team-taught format (V) was the most cost effective. However, the instructors said that 150 participants were too many, but that the format would probably be feasible with a ratio of 4/100. Other costs such as per diem for participants could be eliminated if a district conducted a workshop of this nature that involved only the district's own teachers.

APPENDICES

APPENDIX A

Tables of Adjusted Mean Scores

APPENDIX A

Tables of the adjusted mean scores and associated F-values are listed below. F-values which are significant at .05 and .01 levels are denoted by * and ** respectively.

GRADE 2

TABLE 5

Inservice Program (I-VI)

	I	II	III	IV	V	VI	F
SRA	13.33	14.13	15.46	13.97	14.29	12.67	* 3.00
Low Compreh.	2.27	2.45	2.45	2.43	2.43	2.28	** 5.14
High Compreh.	7.35	8.13	8.36	8.03	8.03	7.52	** 6.82
Low Comput.	7.18	7.85	7.75	7.55	7.88	7.58	* 2.90
High Comput.	8.78	9.38	9.27	9.07	9.43	9.08	2.16

TABLE 6

Inservice Program (I-V)

	I	II	III	IV	V	F
SRA	13.31	14.11	15.73	14.00	14.41	0.67
Low Compreh.	2.30	2.47	2.44	2.45	2.44	0.72
High Compreh.	7.43	8.19	8.38	8.09	8.08	1.63
Low Comput.	7.26	7.90	7.79	7.60	7.94	2.09
High Comput.	8.87	9.45	9.31	9.11	9.50	1.35

TABLE 7

Inservice Program (II-V)

	II	III	IV	V	F
SRA	14.14	15.65	14.01	14.36	0.51
Low Compreh.	2.47	2.43	2.44	2.44	0.06
High Compreh.	8.18	8.33	8.07	8.05	0.32
Low Comput.	7.88	7.76	7.58	7.91	0.96
High Comput.	9.42	9.28	9.11	9.47	0.76

TABLE 8

Socioeconomic

	High		Medium		Low			
	Inserv.	Control	Inserv.	Control	Inserv.	Control	F-Ins.	F-S/E
SRA	14.85	13.00	14.44	12.87	13.02	11.31	** 6.91	* 2.93
Low Compreh.	2.40	2.23	2.44	2.29	2.40	2.24	**11.81	0.69
High Compreh.	7.87	7.55	8.13	7.54	7.68	7.27	** 8.90	* 3.24
Low Comput.	7.66	7.86	7.84	7.60	7.74	7.21	1.98	1.74
High Comput.	9.14	9.54	9.41	9.10	9.16	8.65	0.69	2.47

TABLE 9

Commuting Factor

	Commuting		Non-commuting	
	III	IV	III	IV
SRA	16.16	14.19	15.36	13.10
Low Compreh.	2.39	2.40	2.42	2.49
High Compreh.	8.26	8.09	8.20	7.87
Low Comput.	7.94	7.44	7.73	7.52
High Comput.	9.43	9.33	8.93	9.06

GRADE 5

TABLE 10

Inservice Program (I-VI)

	I	II	III	IV	V	VI	F
Act. Arith. S.C.	20.22	19.40	19.97	19.66	19.92	19.99	0.38
Ideal Arith. S.C.	25.09	25.98	26.13	25.27	25.91	25.90	0.58
Arith. Fun/Dull	9.10	8.70	9.13	8.78	8.82	8.90	0.26
Arith. Hard/Easy	24.33	22.80	23.71	23.79	23.74	23.88	0.95
Debil. Anxiety	33.10	32.28	33.91	32.51	33.06	33.19	0.58
Dec. Notation	3.01	3.36	3.13	3.06	3.05	2.99	1.88
Translation	3.93	4.50	4.39	4.38	4.25	4.13	*2.75
Work with Nos.	4.41	5.01	4.88	4.88	4.79	4.58	**3.32
Geom. Info.	3.15	3.14	3.33	3.06	2.96	2.84	*2.91
Whole Nos. Oper.	3.46	4.19	4.40	4.24	4.35	4.13	*3.79
Whole Nos. Comp.	6.40	7.19	7.84	7.62	7.65	7.32	**4.36
Fractions-Comp.	1.80	2.25	2.33	2.26	2.04	2.07	*2.98
Graphs, Prob., Fns.	4.99	5.29	5.26	5.19	5.08	4.91	*2.24
Comprehension	10.98	11.98	12.07	11.89	11.67	11.29	*2.63
Computation	8.21	9.21	10.17	9.85	9.69	9.37	**3.87

TABLE 11

Inservice Program (I-V)

	I	II	III	IV	V	F
Act. Arith. S.C.	20.23	19.37	19.93	19.69	19.91	0.41
Ideal Arith. S.C.	25.11	25.06	26.13	25.38	26.00	0.63
Arith. Fun/Dull	9.12	8.69	9.10	8.80	8.81	0.29
Arith. Hard/Easy	24.30	22.78	23.64	23.73	23.68	0.91
Debil. Anxiety	32.88	32.28	33.86	32.49	33.09	0.54
Dec. Notation	3.04	3.38	3.16	3.08	3.07	1.54
Translation	3.91	4.52	4.39	4.41	4.27	*2.41
Work with Nos.	4.43	5.02	4.88	4.89	4.81	1.57
Geom Info.	3.17	3.14	3.32	3.06	2.97	1.24
Whole Nos. Oper.	3.47	4.23	4.43	4.29	4.39	**4.27
Whole Nos. Comp.	6.39	7,24	7.85	7.67	7.70	**4.77
Fractions-Comp.	1.80	2.26	2.34	2.27	2.06	**3.59
Graphs, Prob., Fns.	4.99	5.26	5.24	5.20	5.10	0.52
Comprehension	11.00	12.01	12.04	11.92	11.73	1.33
Computation	8.20	9.28	10.17	9.91	9.76	**4.44

TABLE 12

Inservice Program (II-V)

	II	III	IV	V	F
Act. Arith. S. C.	19.34	19.91	19.66	19.88	0.39
Ideal Arith S. C.	26.12	26.18	25.44	26.06	0.42
Arith. Fun/Dull	8.70	9.10	8.82	8.82	0.17
Arith. Hard/Easy	22.79	23.65	23.74	23.69	0.81
Debil. Anxiety	32.36	33.94	32.59	33.15	0.73
Dec. Notation	3.41	3.19	3.10	3.10	1.90
Translation	4.55	4.42	4.45	4.30	1.18
Work with Nos.	5.06	4.93	4.94	4.86	0.52
Geom. Info.	3.16	3.35	3.09	2.99	1.44
Whole Nos. Oper.	4.26	4.46	4.32	4.41	0.28
Whole Nos. Comp.	7.29	7.90	7.71	7.74	0.92
Fractions Comp.	2.28	2.36	2.29	2.08	*2.77
Graphs, Prob., Fns.	5.30	5.28	5.24	5.13	0.51
Comprehension	12.12	12.14	12.03	11.83	0.41
Computation	9.34	10.25	9.98	9.82	1.01

TABLE 13

	Socioeconomic							
	High		Medium		Low			
	Inserv.	Control	Inserv.	Control	Inserv.	Control	F-Ins.	F-S/E
Act. Arith. S.C.	19.05	19.35	19.88	20.00	20.31	20.48	0.37	*3.22
Ideal Arith S.C.	27.13	25.97	25.75	25.98	25.42	25.36	0.69	1.86
Arith. Fun/Dull	8.28	8.55	8.80	8.91	9.67	9.26	0.00	**5.02
Arith. Hard/Easy	23.54	23.42	23.61	23.90	24.29	24.24	0.02	1.20
Debil. Anxiety	33.56	33.81	32.86	33.26	33.54	32.37	0.13	0.71
Dec. Notation	3.55	3.13	3.06	3.00	2.88	2.88	*4.11	**7.78
Translation	4.62	4.33	4.28	4.18	4.34	3.73	**12.13	**4.60
Work with Nos.	5.32	4.69	4.80	4.64	4.76	4.19	**17.62	**4.98
Geom Info.	3.45	3.14	2.96	2.83	3.07	2.65	** 9.10	**7.71
Whole Nos. Oper.	4.33	4.27	4.27	4.14	4.89	4.06	** 7.71	1.99
Whole Nos. Comp.	7.64	7.39	7.54	7.35	8.47	7.17	**10.85	1.72
Fractions Comp.	2.22	2.37	2.08	2.04	2.31	2.10	0.19	**5.42
Graphs, Prob., Fns.	5.51	5.08	5.09	4.95	5.16	4.56	**12.68	*3.57
Comprehension	12.94	11.75	11.67	11.40	11.66	10.35	**16.72	**7.73
Computation	9.85	9.72	9.59	9.36	10.82	9.18	** 8.45	2.49

TABLE 14

Commuting Factor

	Commuting		Non-commuting	
	III	IV	III	IV
Dec. Notation	3.23	3.17	3.20	2.81
Translation	4.24	4.50	4.80	4.15
Work with Nos.	4.84	4.99	4.96	4.69
Geom. Info.	3.39	3.04	3.42	3.06
Whole Nos. Oper.	4.23	4.86	4.37	4.33
Whole Nos. Comp.	7.61	7.85	8.18	7.60
Fractions Comp.	2.42	2.30	2.12	2.10
Graphs, Prob., Fns.	5.11	5.44	5.17	5.13
Comprehension	11.91	12.16	12.40	11.30
Computation	9.97	10.14	10.41	9.75

APPENDIX B

Test Scales

APPENDIX B

TEST SCALES

GRADE 2

Scale Name	Test Form
SRA Total Score	SRA Primary Form D
Lower Comprehension	Grade 2 Computation Form (Spring)
Higher Comprehension	Grade 2 Computation Form (Spring)
Lower Computation	Grade 2 Computation Form (Spring)
Higher Computation	Grade 2 Computation Form (Spring)

GRADE 5

Scale Name	Test Form
Actual Arithmetical Self Concept	NLSMA Grade 5 Battery (Fall, pp 4-10)
Ideal Arithmetical Self Concept	NLSMA Grade 5 Battery (Fall, pp 4-10)
Arithmetic, Fun vs. Dull	NLSMA Grade 5 Battery (Fall, pp 4-10)
Arithmetic, Easy vs. Hard	NLSMA Grade 5 Battery (Fall, pp 4-10)
Debilitating Anxiety	NLSMA Grade 5 Battery (Fall, pp 4-10)
Decimal Notation	NLSMA Grade 5 Battery Section II (Spring)
Translation	NLSMA Grade 5 Battery Section II (Spring)
Working with Numbers	NLSMA Grade 5 Battery Section II (Spring)
Geometry - Informal	NLSMA Grade 5 Battery Section II (Spring)
Whole Numbers - Operations	NLSMA Grade 5 Battery Section II (Spring)
Whole Numbers - Computation	NLSMA Grade 5 Battery Section II (Spring)
Fractions - Computation	NLSMA Grade 5 Battery Section II (Spring)
Graphs, Probability, Functions	NLSMA Grade 5 Battery Section II (Spring)
Comprehension	NLSMA Grade 5 Battery Section II (Spring)
Computation	NLSMA Grade 5 Battery Section II (Spring)

APPENDIX C

List of Participants by District

SPECIALIZED TEACHER PROJECT
MILLER MATHEMATICS IMPROVEMENT PROGRAMS

Teacher Participants
1969-70

ALAMEDA COUNTY

School District	School	Participant
Alameda Unified	Haight	Cowell, Juliette R.
		Hyatt, Sheila
	Mastick	Costedoat, Frances M.
Berkeley Unified	Columbus	Schaeffer, Marilyn J.
	Franklin	McCarthy, Betty M.
	Hillside Pri	Jensen. Norman C.
	Jefferson Elem	Duda, [illegible]pi L.
		Furuichi, Mary A.
		Johnson, Georgia L.
		Wise, Jean
	John Muir	Hearther, Marlene
	Le Conte	Fry, Sue
	Oxford	Braxton, Beverly
	Tilden Pri	Hata, Marrie N.
	Washington	Starck, Juanita R.
	Whittier Univ	Christeson, Iris
Castro Valley Unified	Chabot Elem	Bowhen, Patricia R.
	Clifton	Johnson, Steven B.
		Wescott, Michael L.
	Independent	Conner, Bill P.
	Marshall	Sherman, Clinton F.
	Parsons	Appleton, Marion G.
		Mielke, Mary A.
	Proctor	Boggus, Ann J.
	Sydney	McLaughlin, Marsha
		Pullman, Winifred P.
		Willey, Marilyn
	Vannoy	Schultz, Barbara P.
		Turiel, Arleen
Fremont Unified	Grimmer	Willer, Margery A.
	Green	Heebner, Judith
	Durham	Jacobs, Martin L.
	Mattos	Tingley, Danvil P.
	Mowry Elem	Culbertson, Ella M.
	T. Rix	Hodgkins, Elizabeth Z.
	Vallejo Mill	Potter, Kenneth Jr.
Hayward Unified	Argonaut	Kelly, Marjorie C.
	Burbank Elem	Smith, Shirley J.
		Voeks, Kay

School District	School	Participant
Hayward Unified (Cont'd.)	Cherryland	Burton, Betty L.
		Ramirez, Margaret
	East Ave.	Sullivan, Dorothy
	Eden Gard.	Boyd, Mary E.
	Eldridge	Norum, Betty
		Roper, Alvin E.
	Harder	Condos, Themios
		Flaherty, Cornelia M.
		Margolis, Bernice
	Highland	Valentine, Mary V.
	Kimball	Pruitt, Marie G.
		Sandsmark, Lois
	Laurel	Chapman, Myrtle R.
		Hoyt, Marilyn
	Longwood	Barron, Ida M.
	Lorin Eden	Alvarez, Bonnie
		Mazhar, Jeanne
	Ruus Elem	Kidder, Mary
	Schafer Park	Bremer, Barbara
		Wang, Lucy C.
	Shepherd Elem	Little, Evelyn M.
	Southgate	Ng, Kay T.
	Treeview	Fuentes, Jeanne M.
		Mull, Marilyn J.
	Winton Grove	Corsi, Norine
		Tarleton, Letha
Livermore Val. Jt. Unif.	Almond Ave.	Sorensen, Olive
	Emma Smith	Cosby, Connie
	Fifth St.	Larsen, Helen Y.
	Green	Mitchell, Mildred M.
	Jackson Ave.	Kashiwamura, James S.
	Michell Elem.	Clark, Ronald D.
	Sonoma	Knott, Erna
Murray Elementary	Murray Elem	Hinton, Michael
		Hsu, Shirley
Newark Unified	A. L. Schilling	Curtiss, Georgia
		Grissom, Carmen
	E.L. Musick	Williams, Sally A. Matz
		Weber, Mary
	H.A. Snow	Paulson, Peggy J.
	J. Bunker	Rawlinson, Milene
		Shelley, Mary T.
		Swithenbank, Ila
	Lincoln	Rankin, Laura
	Milani, L.	Cook, Florence
		Meagher, Patricia
New Haven Unified	Searls	Medeiros, Kalie
	White	Safer, Lola

School District	School	Participant
Oakland Unified	Chabot	Shaw, Mary E.
	Garfield Elem	Jones, Joyce C.
	Millcrest	Smith, Robert L.
	Lafayette	Perry, Ardath
		Savelle, Julia A.
	J. Miller	Harrion, Bonnie J.
		Walden, Margit
	Munck	Zoslosky, Anastasia
	Santa Fe	Williams, Robert L.
	Sequoia	Cunlifte, Dorothy E
Pleasanton Jt. Elem.	Alisal	Garibaldi, Ralph H.
		Ingham, Thomas L.
		Warren, Delton E.
San Leandro Unified	Garfield	Allen, Joan
		Reardon, Alma M.
	Madison	Nardine, Henry
	Roosevelt	Muir, Betty
	Washington	Clark, Barbara
	Wilson	Bramsman, Victoria L.
		Jaeger, Joyce M.
San Lorenzo Unified	Colonial Acres	Willson, Robert I.
	Dayton	Lee, Elizabeth Y.
	Del Rey	Marciel, Doris A.
	Lorenzo Manor	Grundel, Carmelina
ALPINE COUNTY		
Alpine County Unified	Bear Val. Elem.	Huberty, Alice T.
AMADOR COUNTY		
Jackson Unified	Jackson Elem	Davis, Donna M.
Oro Madre Unified	Sutter Cr.Elem.	Wallace, Mary L.
BUTTE COUNTY		
Chico Unified	McManus	Murray, Francis
	Neal Dow	Richhart, Geraldine
Paradise Unified	Ponderosa	Plumb, Lucille
CONTRA COSTA COUNTY		
Antioch Unified	Bidwell	Winniford, Marie
	Fremont	Winquist, Mabel C.

School District	School	Participant
Antioch Unified (Cont'd.)	Kimball	Wilkinson, Stephen F.
	Turner	Morgan, Marilyn J.
Byron Union Elementary	Byron	Skoglund, Neva G.
Lafayette Elementary	Happy Valley	Steel, Kathryn L.
	Springhill	Castner, William E.
Martinez Unified	John Swett	Sedgwick, Gerald H.
Moraga Elementary	Los Perales	Dean, Kenneth M.
Mt. Diablo Unified	Cambridge	Herr, Michael A.
		Wong, Sheryl
	Crawford	McCormick, Cecile
	El Monte	Millen, Dorothy J.
	Larkey	Fleming, Ida J.
		Lederer, Betty J.
	Monte Gardens	Swaim, Jeanene
	Valhalla	[illegible], Pearl
		[illegible]r, Milo
	Ygnacio Val	Holmberg, Verda F.
Orinda Union	Glorietta	Coffey, Margaret
Richmond Unified	Bayview	Redick, Sarah
	Collins	Brown, Norma J.
DEL NORTE COUNTY		
Del Norte County Unified	Crescent Elk	Kincaid, Mary S.
EL DORADO COUNTY		
Camino Union Elementary	Camino Union	McGlothen, Raymond C.
		Sydnor, Darlean
Northside Union Elementary	Northside	Block, Gerald
Rescue Union	Jackson	Ford, Irene
		Poe, Myrtle M.
FRESNO COUNTY		
Auberry Union	Auberry Union	Rempel, Evalene E.
Clovis Unified	Cole Elem	Schumacher, Edith
Fowler Unified	Malaga Elem	Benson, Harold E.

School District	School	Participant
Fresno City Unified	Addams	Dupzyk, Norma P.
		Watson, Billy B.
	Baird	Meredith, Grace M.
		Oja, Lydia
	Calwa	Harvill, Sydney
	Centennial	Varnell, Virla
	Dailey	Reiss, Bonnie
	Easterby	Carpenter, Francelia
	Ericson	Putler, William
	Figarden	Richner, Robert D.
	Franklin	Urbanes, Ella B.
	Fremont	Morton, Ann T.
	Holland	White, Margot
	Homan	Schulmeister, Nancy J.
	Kirk	Allen, Miriam F.
	Kratt	Hinkly, Marjorie M.
	Lafayette	Nunez, Maria
	Lincoln	Hubbart, Jeannette B.
	Lowell	Fritz, Carrol G.
		Towne, Frances G.
	Malloch	Teichman, Helen
	Norseman	Webster, Elsie
	Robinson	Person, Lorraine
	Vinland	Maddux, Edna
		Mosley, Nellie S.
		Swan, Kay E.
	Wishon	Hess, Cecile M.
	Wolters	Allard, Kathryn
		Byrnes, Florence
		Callahan, Jane
Selma Unified	Washington	Ruether, Beatrice
GLENN COUNTY		
Hamilton Union	Hamilton	Savin, Esther M.
		Wion, Gloria J.
Willows Unified	Murdock	Plocher, Esther L.
IMPERIAL COUNTY		
Calexico Unified	Jefferson	Davis, Janet
		Hamby, William F.
	Rockwood	Ferson, Sylvia E.
INYO COUNTY		
Bishop Union Elementary	Home Street	Smith, Floyd B.

School District	School	Participant
KERN COUNTY		
Arvin Union	Sierra Vista	Drake, Sandra L.
Bakersfield City	Castro Lane	Boudreaux, Claude Francis
		Brewer, Virginia
	Baker	Pan, Eunice
	Eissler	Londquist, Donald J.
	Harris	Goossen, Chloe J.
	Longfellow	Jacobs, Margaret M.
China Lake	Desert Park	Casados, Yolanda
	Groves	Bjorklund, Elizabeth
		Bruce, Wallace P.
		Mayne, Evelyn M.
	Richmond	Bruce, Doris M.
Delano Union	Cecil Ave.	Dawson, Eva
	Fremont	Duke, Vernon
		Butler, Mary C.
	Terrace	Glover, Eleanor M.
Greenfield Union	Fairview	Edmondson, Janis
		Lanier, Glenda A.
		Villanueva, Theresa M.
	Plantation	Hoskins, Helen
Lamont Elementary	Alicante	Belt, Wilma
KINGS COUNTY		
Central Union Elementary	Central Union	Yenger, Katherine A.
Lemoore Elementary Union	Meadow Lane	Pope, Fred
Reef-Sunset Union	Avenal	Hodges, Ray
LAKE COUNTY		
Konocti Unified	East Lake	Bowers, Melvyn K.
LASSEN COUNTY		
Susanville Elementary	McKinley	Cook, Charlene S.
LOS ANGELES COUNTY		
ABC Unified	Kennedy	Newkirk, Judith

School District	School	Participant
ABC Unified (Cont'd)	Palms	Punt, Joyce Hoover, Gloria
Arcadia Unified	Baldwin Stocker	Weber, Robert
Azusa Unified	Charles Lee	Heckman, Gary
Baldwin Park Unified	Central	Palacios, Sheilah
	Foster	Lane, Prudence Mussack, Evelyn E.
	Geddes	Kaden, Rudolph Jr.
	Kenmore	Havens, Marie
	Tracy	Emmons, Beverly Ann
	Walnut	Gerard, Bryson H.
Bassett Unified	Tonopah	Berry, Betty Kaenel, David G.
Bellflower Unified	Ernie Pyle	Schumock, Fred R.
	Jefferson	Campbell, Edith M.
Beverly Hills Unified	Horace Mann	Kades, Norman J.
Bonita Unified	Gladstone	Lambert, Joseph S. Chapman, Pattee
Charter Oak Unified	Glen Oak	Marr, Jerold B.
	Palm View	Marcarello, Teresa
	Willow	Fletcher, John E.
Compton City	Bursch	Ford, Amelia Smith, Nettie B.
	Colin Kelly	Alexander, Glenn L.
	Dickison	Olson, Maralyn
	Tibby	Schock, Dolores
Covina Valley Unified	Ben Lomond	Betts, Mavis Lipscomb, Eleanor L.
	Covina Elem	Fox, Sandra S.
	Grovecenter	Thorson, Beverly E.
	Valencia	Davenport, Loreta
Culver City Unified	El Marino	Krasno, Marian R. Weber, Marie
	Washington	Richardson, Mary L.
Downey Unified	Alameda	Ybarra, Diane E.
	Ed Lewis	Wagner, Luella A.
	Rncho Snta Gert.	Boisvert, Paul G.
Duarte Unified	Maxwell	Dubois, Barbara Proud, B. Warren

School District	School	Participant
East Whittier City	Ceres	Lannom, Ruth
		McClintock, Phyllis
	C.T.Samuels	Francks, Evelyn
	Laurel	Bradford, Suzanne V.
	Mulberry	Apodaca, Helen C.
	Murphy Ranch	Cram, Zua N.
		Mullen, Doris G.
	Orchard Dale	Smith, Emma M.
	Valley View	Olson, Gladys
El Rancho Unified	Obregon	Stil[illegible]l, LaVaughn R.
	Maiseland	Gilpin, Evelyn
	L. T. Magee	Reed, Jerry R.
		Swerdlow, Evelyn
	Valencia	Caylor, Dorothea
		Orr, Carol
Enterprise City	Mark Twain	Campbell, Leola
		McCaleb, Goldie B.
	McKinley	McClure, Lou S.
Garvey	Fern	Dugdale, James B.
Glendora Unified	La Fetra	Welte, B. R.
	Roosevelt	Schoolmaster, Joan
	Sellers	Booth, Fonda D.
	Sutherland	Rector, Margaret M.
Hudson	Dibble	Cantu, Ernest
	Grazide	Steig, Joyce
	Hudson	Hatch, Alice M.
	Los Molinos	Rains, Clara B.
	Temple	Kohlstedt, Roger
Inglewood Unified	Center Park	Erznoznik, Marie P.
Keppel Union	Alpine	Patton, Lois
	Antelope	Persons, Gene
Las Virgenes Unified	A.E. Wright	Kim, Susan H.
	Round Meadow	Haugan, Barbara J.
		Hedrick, Mary L.
Lennox	Buford	Howell, Alice A.B.
	Jefferson	Deitch, Donald I.
	Larch	Sandoval, Oliver Z.
		Todd, Margo M.
Long Beach Unified	Addams	Anderson, Dorothy M.
		Culler, Hazel J.
	Barton	Kompleski, Myrtle
		Wharton, Diane

School District	School	Participant
Long Beach Unif. (Cont'd.)	Birney	Probasco, Lila R.
		Sturgeon, George F.
	Bixby	Phillips, Hazel
	College Inter.	Sturiale, Frank
	Cubberley	Zipper, Irma
		McFarling, Velma L.
	Field	Adwan, Nancy H.
	Gant	Whitman, Josephine M.
	Garfield	Ling, Eva M.
	Grant	Corrigan, Bernice B.
	Harte	Johns, Ada L.
	Longfellow	Barr, Janis
	Lowell	Sirotnak, Gloria F.
	Newcomb	Clepper, Linda
	Riley	Pendleton, Joyce L.
	Roosevelt	Williams, Louise E.
	Sutter	Caddick, Judith
	Twain	Hutton, Thelma B.
Los Angeles Unified	Ascot Ave.	Austin, Ernestine C.
		Straw, Carolyn L.
	Bassett	Cooper, Annlee
	Beachy Ave.	Mayzels, Jean B.
	Budlong Ave.	Brock, Janet M.
	Bushnell Way	Galvin, Thomas L.
	Calvert St.	Bradley, Mary K.
	Carson St.	Rebolt, Barbara B.
		Bryan, Dorothy I.
	Castelar	Cohen, Susan
		Walter, Patricia S.
	Collier St.	Bradley, Daniel W.
	Cohasset St.	Chase, Nettie
	Dahlia Heights	Overlock, Marie S.
		Eskin, Anne B.
	Del Amo	Warner, Hollis E.
	Devonshire	Wormell, Lynda S.
	El Dorado	Bruhn, Donna C.
		Knepp, Mary E.
	Euclid Ave.	Isomoto, Sandra J.
	54th Street	Williams, Esther
	Gledhill	Kent, Beatrice
		Hopkins, Jane W.
		Morgan, Ellen
	Graham Elem	Holman, Edna L.
		Mack, Marvelous O.
		Morgan, Ruby M.
		Payton, Charlye W.
	Grant Elem	Saund, Marian
	Griffin Ave.	Brown, Clayton T. Jr.
	Hadden Ave.	Gallup, Virginia F.
		Samoss, Carol W.
	Hawaiian Elem	Neff, Ruby K.
	Hobart Elem	Bergen, Libby R.

School District	School	Participant
Los Angeles Unified (Cont'd.)	Lassen	Griffith, Alice H.
	Lemay	Roland, Bernice
	Limerick Ave.	Takahashi, Charlotte
	Loreto St.	Throne, Ruth S.
	Loyola Village	Cantwell, Aileen M.
	Marianna Ave.	Dorn, Allie L.
	Menlo Ave.	McDonald, Constance K.
		Wallace, Lynn
	Miles Ave.	Leung, Mei L.
	93rd St.	Lorack, Ella M.
	Prairie St.	Horwitz, Sonya
	Purche Ave.	Hall, Betty A.
	Raymond Ave.	Davis, Irma W.
	Rio Vista	Weiss, Hilda L.
	Rosemont Ave.	Miller, Wilma F.
	Russell Elem	Lewis, Archie T.
	San Pascual Ave.	Cheek, Letitia H.
	75th Street	Wells, Carolyn R.
	74th Street	Bosse, Barbara J.
	Wadsworth	Washington, Joan
	Western Ave.	Moore, Esther B.
	Wilmington Pk.	Lambertson, Blanche H.
	Winnetka Ave.	Duga, Sharon
		Tucker, Coralee
	Sharp Ave.	Rangel, Doris
	Sierra Park	Bartoline, Wendy V.
	66th Street	Osborne, Evelyn E.
	Stonehurst	Remy, Dorothy S.
		Wetterau, Joyce D.
	Sunland	Smith, Patricia K.
	Sunny Brae	Roberts, Janine D.
	Trinity St.	Freeman, Gwendolyn P.
	Vaughn	Wade, Allura F.
		Wilson, Edna D.
	Vermont Ave.	Williams, Cheryl A.
Los Nietos Elementary	Ada Nelson	Wilkes, Joan B.
	Aeolian	Smith, Lynn A.
	Rcho S Gertrudes	Hodel, Hazel M.
Lowell Joint	Olita	Schwantz, Mollie
Lynwood Unified	Lincoln	Blinder, Ruth
	Roosevelt	Berhendt, Marilyn
Manhattan Beach City	Robinson	Barrett, Patricia L.
	Pacific	Bower, Jeannette W.
Monrovia Unified	Mayflower	Knaggs, Kathryn L.
	Plymouth	Stert, Betty J.

School District	School	Participant
Montebello Unified	Greenwood	Santilli, Virginia M.
		Scott, Joann
Mountain View	Baker	Ishizu, Fuji
		Nobui, Leatrice K.
	Cogswell	Gurule, Laureen L.
	La Primaria	Ralston, Nancy R.
	Linda Vista	Yamamoto, Betty H.
	Maxson	Kupper, Barbara
		Scanlon, Katherine
	Monte Vista	Mahn, Doris
		McHenry, Maudie M.
	Parkview	Smith, Lewis M.
		Wimberly, Ronna M.
	W. Payne	Dipeso, James C.
Norwalk-LaMirada	Anthony	Shaw, Sybil
		Zdeb, Merrie Ann
	Dolland	Hogrefe, Kathy
		Dakan, Janet R.
		Wright, Ruby
	Dulles	Grosfeld, Kathy
		Orr, Willis
	Eastwood	Byrne, Michael
		Stalman, Carol A.
		Smith, Mary Ann
	Escalona	Anderson, Sophie
		Brown, Sharon
	Foster Road	Golding, Nelda
		Haake, Shirley
		Sampson, Michael
		McDonald, Gertrude
	Gardenhill	Hively, John A.
		Schneringer, Martha
	Glazier	Kato, Jean
		Kusumoto, Frances
	Grayland	Bilby, Ethel
		Kelly, Carol
		Wolfe, John
	Hargitt	Dunn, Johnnie
		Kimura, Jo A.
	Hoxie Ave.	Lachance, Susan
		Stanley, Diane
	Hutchinson	Iwasaki, Barbara
		Morris, Karen
	Johnston	Allen, Delores
		Baldridge, Linda
		Sayles, Daisy
		Walker, Lowell
	Kling	Chase, Grace
		Teramoto, Lorraine

School District	School	Participant
Norwalk-LaMirada (Cont'd.)	Lampton	Drake, Mary
		Cole, Frances
		Combes, Joyce
	La Pluma	Daggett, Rod
		Marcum, Norinne
		Robinson, Dwayne
	Mesa	Gilinsky, Leona
		Roberts, Joanne
		Vihlen, Jean
	Moffitt	Perry, Janice
		Uemura, Aileen
	Morrison	Barnhart, Jane
		McLelland, Gladys
	New River	Altmann, Ann
		Lopez, Bill
		Goenne, Jeannine M.
	Nottingham	Ollmann, Evelyn
		Tong, Jerry
	Nuffer	Gurule, Carol
		Lewis, Lois
	Ramona	Gambill, Marty
		Watson, Ruth
	Rancho	Mendenhall, Wilma
	Waite	Bard, John
		Paris, Virgene
		Stephens, Georgia
Palmdale Elementary	Yucca	Boyd, E. Diane
Palos Verdes Peninsula Unif.	Ladera Linda	Guerrero, Joan
	Montemalaga	Gump, Marion
	Pedregal	Koniecy, Suzanne S.
	Vista Grande	Bauer, Sally K.
Pasadena Unified	Audubon	Spina, Frederick
	Don Benito	Bowman, Gregory
Pomona Unified	Harrison	Rumph, Florence
	Kellogg	Snyder, John L.
	Westmont	Romspert, Lisabeth
	Yorba	Loomis, Alden
Redondo Beach City	Birney	Kuhn, Beth I.
	Cleveland	Dodge, Avis
	Jefferson	Bishop, Gail E.
	Madison	Radcliff, Johnnie S.
	South	Kuyat, Carol G.
	Washington	Conn, Sybil S.
		Ferguson, Jennie B.
Rowland Elementary	Farjardo	Milligan, Patricia C.
	Hollingworth	McCarville, Mary

School District	School	Participant
Rowland Elementary (Cont'd.)	Hurley	St.John, Willard
	Killian	Nordquist, John M.
	Ybarra	Berns, Doris K.
		Schuricht, Paul W.
Temple City Unified	Cloverly	Burwell, Leonard L.
	Longden	Gee, William
		Stover, Catherine S.
Walnut	Vejar	Norris, Louise
	Walnut Elem	Lyons, Roberta
Willowbrook	Anderson	Lewis, Harriette M.
		Walden, Jessie M.
	Carver	Jones, Annie H.
		Liberto, Margaret R.
	Lincoln	Armstrong, Lula M.
		Jordan, Helen E.
	King	Davis, Bertha K.
		Hill, D. Rhea
		Hughes, Ollie M.
MARIN COUNTY		
Dixie Elementary	Dixie	Bernard, Gladys M.
		McCue, Margaret E.
Lagunitas Elementary	San Geronimo	Murphy, Margaret A.
Novato Unified	Hamilton	Wagner, Nedra J.
	Loma Verde	Jones, Eleanor
		Sung, Joan S.K.
	Lu Sutton	Vestal, Ronald L.
	Marion	Zaro, Rita M.
Reed Union	Bel Aire	Nata, Katrina B.
		Schindel, Cheryl
		Tanaka, Shirley N.
Ross Elementary	Ross Grammar	Hardy, Dorothy L.
San Anselmo Elementary	Brookside	Baker, Kerin A.
San Rafael City	Short	Petropoulos, Barbara
Sausalito Elementary	Central	Edwards, Virginia G.
		Kelly, Ann
		Thurman, Barbara W.
	King	Kincaid, Kent
		Menaster, Ray

School District	School	Participant
MENDOCINO COUNTY		
Anderson Valley	Anderson Val.	Johnson, Lawrence X.
Arena Union Elementary	Arena Elem	Rogers, Susan S.
Fort Bragg Unified	Dana Gray	Gjerde, Marion
Willits Unified	Brookside	Kennedy, Evelyn
MERCED COUNTY		
Atwater Elementary	Shaffer	Delacruz, Gretchen K.
Ballico-Cressey Elementary	Cressey	Doolin, Emily
Dos Palos Joint Union Elem	Dos Palos	Green, Juanita Souther, Elizabeth H.
Hilmar Unified	Elim	Grant, John R.
Le Grand Union Elem	Le Grand	Whitmore, Irene L.
Merced City Elem	C. Wright Franklin	Furtado, Marceline W. McLean, Betty H.
Winton Elementary	Winton	Mello, Peggy F.
NAPA COUNTY		
Napa Valley Unified	Lincoln Elem	Frasher, Katheryn Stevenson, Martha D.
	Snow	Kulas, Suzanne
	Vichy Elem	Peters, Mary M.
	West Park	Honodel, Deloris C.
NEVADA COUNTY		
Grass Valley Elementary	Hennessy	Hale, Dan
ORANGE COUNTY		
Anaheim City Elementary	Juarez	Olson, Elizabeth
	Loara Elem	Liles, Carol J.
Capistrano Unified	R.H. Dana	Frankovic, Sharyn K.
Centralia Elementary	Danbrook	Broberg, Theodore C.

School District	School	Participant
Fullerton Elementary	Acacia	Wise, Margaret R. Yee, Lydia
	Commonwealth	Bohannan, Wilma J. Peterson, Claudine R.
	Golden Hill	Kreutzer, Dorothy
	Maple	Rupe, Anne
	Sunset Lane	Kantner, George H.
	Woodcrest	Coons, Keith R. Huestis, Phyllis A.
Garden Grove Unified	E.M. Evans	Halsey, Kathleen M.
Magnolia Elementary	E.L. Walter	Blackwell, Claudia E.
Ocean View Elementary	Haven View	DeFrank, Jeralynn J.
	Larkview	Tomei, Cherub A.
Orange Unified	Crescent	Nicholson, Dorothy J.
	Fletcher Elem	Fritts, Evanita P.
	Handy Elem	Stoddard, Carol A.
	Serrano	Dennis, Eloise B.
Tustin Elementary	Nelson	Kelley, Lorna Myers, Lolly
Westminster Elementary	John Land	Rice, Ronald W.
	Ray Schmitt	Meinecke, Kathleen
PLACER COUNTY		
Placer Hills Elementary	Placer Hills	Foster, P. Jane Smith, Carol
PLUMAS COUNTY		
Plumas Unified	Greenville	Kurtz, J. Cornell
	Quincy Elem	Bequette, Billie E. Roloff, Richard A. White, Karen L.
RIVERSIDE COUNTY		
Banning Unified	Central	Hurley, Andrew
	Hemmerling	Aguirre, Sibyl B.
Corona Unified	Parkridge	Vanzee, Genora M.
Desert Sands Unified	Roosevelt	Turpin, Doris

School District	School	Participant
Hemet Unified	Hemet Elem	Goff, Billie A.
	Ramona Elem	Richter, Jean
Jurupa Unified	Pacific Ave.	Hardin, Ollen B.
	Pedley	Culling, Lila
		Sexton, R. Clifford
	W. Riverside	Center, Thelma M.
Palo Verde Unified	Ruth Brown	Parker, Sibyl W.
Val Verde Elementary	Val Verde	Curtis, Barbara Ann
SACRAMENTO COUNTY		
Center Joint Elementary	Spinelli	Chase, Fay E.
	Center Joint	Schwartz, Marjorie
Del Paso Heights	Fairbanks	Rivenbark, Joan
	Garden Valley	Nugent, Robert L.
Elk Grove Unified	McKee Elem	Horigan, Carmel
Folsom-Cordova Unified	Williamson	Harbert, Bessie D.
Galt Joint Elem	Fairsite	Evans, Elvera L.
		Ford, Jennie F.
North Sacramento Elementary	Gardenland	Weygandt, Cleo
Rio Linda Union	Holmes	Kincaid, Jo C.
	Vineland	Hof, Marjorie
River Delta Unified	Iselton Elem	Ryon, Lulie
Robla Elementary	Taylor St.	Yamamoto, Helen K.
Sacracamento City Unified	Birney	McFarland, Margaret
	Donner Elem	Kriege, Dorothy
	Kemble Elem	Wilson, Helen M.
	Harkness	Sweeney, Catherine N.
	J. Bidwell	Holland, Dolores
		McLaughlin, Doris J.
		Missig, Donald H.
		Stadler, Dorothy
	Cabrillo	Park, Beverly W.
	Nicholas Elem	Shingleton, Mary A.
	O.W. Erlewine	McShane, Sharon R.
	Pacific	Hultgren, Lorna
San Juan Unified	Greer	Caylor, Ruth C.
	Mitchell	Grendon, Jeannette M.

School District	School	Participant
SAN BENITO COUNTY		
Hollister Elementary	Fremont	Aubin, Bryan
SAN BERNARDINO COUNTY		
Alta Loma Elementary	Alta Loma	Nilsen, Robert K.
Barstow Unified	Cameron Elem	Merchant, Thomas L.
Hesperia Elementary	Joshua Circle	Gay, J. Murray
Morongo Unified	Yucca Valley	Nickell, Glenna
Ontario-Montclair Elem	Monte Vista	Lowry, Frances D.
San Bernardino City	Eliot Elem	Burns, John M.
Trona Joint Unified	Trona Elem	Smith, Maxine O.
Victor Elementary	Del Rey Village	Mitchell, Edolene Coinson, Lillian C.
SAN DIEGO COUNTY		
Cajon Valley City Elementary	Bostonia Cuyamaca Lexington	Olden, Mary E. Senior, Ann E. Ruck, Nancy White, Marjorie
Cardiff Elementary	Cardiff	Eisfeld, Mardelle B.
Carlsbad Union Elementary	Buena Vista	Black, Lillie M. Clifton, Helen
Chula Vista City	Rohr Cook Rice Loma Verde Finney Rosebank Silver Wing Sunnyside Valle Lindo	Kennedy, Stella Barr, Dora Roise, Mary Linton, Dolores L. Squibb, Dwight R. Capps, Charlotte F. Bjornstad, George O. Hess, Agnes B. Coleman, Kathryn Avery, Ruby D. Seiler, Barbara H. Engberg, Sherry Kruetzfeldt, Mary L.
Encinitas Union	Capri	Staley, Helen M.

School District	School	Participant
Escondido Union	Conway	Dennison, Eileen M.
Fallbrook Union	Iowa Street	Voorhis, James W.
	Ellis Elem	Dornon, Don R.
	Ellis Pri	Earls, Madge C.
		Kinsey, Catherine
	Pendleton	Brannan, Gene D.
Lakeside Union	Lakeside Farms	Kime, Susan
		Mundy, Priscilla
	Lindo Park	Lewis, Geanell
	Riverview	Shears, Vernon V.
LaMesa-Spring Valley	Kempton	Claridge, Deva R.
	La Mesa Elem	Arnold, Judy
		Kemper, Helena K.
	Northmont	Rosenberg, Raymond
	Rancho Elem	Crane, E. L.
		Lyons, Grace M.
	Spring Valley	Happel, Katherine K.
Lemon Grove Elementary	Golden Ave.	Purves, T. Rolland
	Vista La Mesa	Wittrock, Joan
National Elementary	El Toyon	Knapp, Luella P.
Oceanside Union Elementary	Mission	Dorrell, Margaret
	San Luis Rey	Edwards, Gladys
	San Rafael	Henry, Sylvia
	Santa Margarita	Carson, Patricia E.
Orange Glen Elementary	Orange Glen	Wicklund, Donald E.
		Harden, James L.
Ramona Unified	Ramona Elem	Boyle, Rose M.
Rancho Santa Fe Elementary	Rncho Santa Fe	Cook, John E.
		Spivey, William B.
		Taylor, William M.
San Diego Unified	Angier	Mills, Joseph M.
	Barnard	White, Frances W.
	Beale	Whipple, Alfred H. Jr.
	Birney	Fadem, Phyllis R.
	Carson	Fintel, Fay A.
	Dewey	Toyen, Marsha S.
	Farnum	Whitten, Elwanda K.
	Florence	Sypher, Diane
	McKinley Elem	Gladden, Edith C.
	Hardy Elem	Atkinson, Elizabeth T.
		Shriver, Francis J.
	Hearst	Richmond, Beverly

School District	School	Participant
San Diego Unified (Cont'd.)	Lafayette	Williams, Gertrude F.
	Longfellow	Jackson, Donna
		Moraros, George N.
	Muir	Ryan, Judith A.
	Stockton	Stebbins, Beverly J.
	Wiggin	Greene, Hazel L.
Santee Elementary	Carlton Hills	Souviney, Randall J.
	Harritt	Mathew, Mary Raddatz
		Sesler, Sandra A.
	Santee	Richardson, Judith G.
		Trousdale, Elta S.
San Ysidro Elementary	Beyer	Martin, Alexander
	Sunset	Russell, Geraldine K.
South Bay Union Elementary	Imperial Beach	Pryor, Thelma G.
	Sunnyslope	Kijanka, Bogdan F.
Vista City Unified	Olive	Collins, Billee A.
		Mohr, Margaret R.

SAN FRANCISCO COUNTY

San Francisco Unified	Fremont	Higgins, Joan C.
	Grant	Brown, Connie
	Junipero Serra	Allen, Ella
	Kate Kennedy	Pengra, Nanci R.
	McKinley	Louie, Samuel
	Lawton	Omatsu, Ruth S.
	Paul Revere	Hill, Nelva
		Wooster, Joyce S.
	Twin Peaks	Epstein, Richard

SAN JOAQUIN COUNTY

Lincoln Unified	Williams	Willems, Edwin
Lodi Unified	Lakewood	Fields, June
Ripon Unified	River	Watters, Marion L.
Stockton Unified	Fillmore	Tom, Raymond
	Garfield	Domer, Barry W.
		Lina, William E.
	Jackson	Brown, Evelyn F.
	Roosevelt	Stuermer, Lucile A.
	Taylor	O'Brien, Stephen T.

School District	School	Participant
SAN LUIS OBISPO COUNTY		
Paso Robles Union Elementary	Georgia Brown	Smith, Harold G.
SAN MATEO COUNTY		
Cabrillo Unified	Half Moon Bay	Kinsley, Leslie
Las Lomitas Elementary	La Loma	Leuthauser, Dean
Portola Valley Elementary	Corte Madera	Costello, Kathleen
San Carlos Elementary	Brittan Acres	Mitchell, William R.
	Heather	Garcia, Florinda
	White Oaks	Searfoss, Elizabeth
San Mateo City Elementary	A.H. Horrall	Schwerin, Stanley J.
	Audubon Elem	Mott, Gregory E.
	Foster City	Murrock, Caroline
	San Mateo Knolls	Farrington, Marcella
	Lakeshore	Heagerty, Anita
		Mellish, Leana F.
	Park	Diskin, Marjorie
SANTA BARBARA COUNTY		
Goleta Union	Fairview	Morey, Susie
Lompoc Unified	Clarence Ruth	George, Phyllis
	Los Padres	Eatmon, Richard
		Bigotti, Laureen L.
Orcutt Union Elementary	Orcutt	Younglove, Hugh
Santa Barbara City	Adams	Marr, Charles A.
Santa Maria Elementary	Rice	Lettau, John H.
	Tunnell	Wimer, Janice L.
Solvang Elementary	Solvang	Long, William D.
SANTA CLARA COUNTY		
Alum Rock Union Elementary	Mayfair	Jordan, Bernice B.
	Hubbard	Campbell, Sylvia S.
Campbell Union Elementary	Parkway	Carlozzi, Peter J.
	Quito	Goth, James E.
	San Tomas	Steiner, F. Robert

School District	School	Participant
Cupertino Union Elementary	Nimitz	Brittain, Barbara W.
	Stevens Creek	Reiber, Mary L.
Evergreen Elementary	Cadwallader	Goertz, Minnie C.
		Mangold, Jane E.
	Whaley	Arneson, Margaret A.
Franklin-McKinley Elementary	Hellyer	Kilgore, Claudia J.
		Morrissey, Mary
	Hillsdale	Bridges, Marilyn
		Dickerson, Jacqueline
		Mackie, Aileen
	Kennedy	Vaughan, Jean T.
	Los Arboles	Spalding, Quida K.
	McKinley	Herrington, Kathleen
	Santee	Hovey, Carla R.
		Meadows, Jeanne R.
	Seven Trees	Persson, Lester C.
Loma Prieta	Loma Prieta	Seaman, Sarah
Los Gatos Union Elementary	Berry	Ng, Elsie E.
	Lexington	Clinton, Shirley A.
		Miller, Marion M.
Moreland Elementary	Country Lane	Williamson, Richard
San Jose Unified	Darling	Norman, Ella F.
		Terril, Consuelo C.
	Cory	Lewis, Robert
	Empire Gardens	Bank, Rachel
		Corrigan, Verna
		Jernigan, Joan
	Gardner	Strong, Beverley J.
	Henderson	Stege, Judith A.
		Thompson, Ina
	Hester	Gray, Mary H.
		Wright, Frances W.
	Jefferson	Schag, William C.
	Merritt Trace	Blakeney, Shirley
	Reed	Werner, Charlene
	Schallenberger	Long, Eva M.
	Simonds	Giddings, Dorothy
		Riebhoff, Constance M.
	Valley View	Addington, Rebecca S.
	Williams	Holmes, Kenneth E.
		Lloyd, Frances E.
		MacDiarmid, Barbara
Santa Clara Unified	Bracher	Emfinger, Diane
		Hicks, Geraldine
		Pazemenas, Nancy

School District	School	Participant
Santa Clara Unified (Cont'd.)	Laurelwood	Wilson, Robert C.
	Washington	Carlson, Gaye
Saratoga Union Elementary	Argonaut	Kossen, Florence G.
	Saratoga	Kossen, Mary
Sunnyvale Elementary	Ellis	Semas, Merry A.
SANTA CRUZ COUNTY		
Soquel Union Elementary	Capitola	King, Mary
SHASTA COUNTY		
Cascade Union Elementary	Verde Vale	Burket, Duane
Enterprise Elementary	Rother	Wall, Judith L.
Shasta Lake Union	Deer Creek	Lott, Martin D.
SIERRA COUNTY		
Sierra-Plumas Joint Union	Loyalton Pri	Bearden, Judith B.
SISKIYOU COUNTY		
Etna Union Elementary	Etna Union	Prestegard, Roger B.
Happy Camp Union Elem.	Happy Camp	Long, Richard A.
SOLANO COUNTY		
Fairfield-Suisun Joint Unif.	Richardson	Nesbitt, Bernice
		Rodwell, Mrs. Leonard
Travis Unified	Center	Hunter, Carolgene
		Maddox, Velma R.
Vacaville Unified	Monte Vista	Pryor, Margaret T.
	Ulatis	Walker, Elinor W.
Vallejo Unified	Steffan	Enea, Margaret
SONOMA COUNTY		
Bennett Valley Union	Bennett	Yount, Mira E.

School District	School	Participant
Healdsburg Union Elementary	Fitch Mountain	Vanmatre, John R.
Mark West Union	Mark West	Brazier, Sharon W.
Rincon Valley Union	Matanzas	Sondergard, E. Clarice
Sonoma Valley Unified	El Verano	McJimsey, Sandra E.
STANISLAUS COUNTY		
Ceres Unified	Caswell	Farquhar, Virgil
	Don Pedro	Guthrie, Ayris
Modesto City	Everett	Brasch, Adolph E.
	Garrison	Brown, Marjorie J.
Riverbank Elementary	California	York, Suzanne I.
	Cardozo	Nevins, Roy M.
SUTTER COUNTY		
Pleasant Grove Jt. Unified	Pleasant Grove	Newton, John M.
TEHAMA COUNTY		
Red Bluff Union	Jackson	Sanford, Ernest
	Lincoln	VanVleet, Edward L.
TULARE COUNTY		
Cutler-Orosi Unified	El Monte	White, Cecil H.
	Yettem	White, Leona M.
Earlimart Elementary	Earlimart	Prophet, Leslie
Lindsay Unified	Jefferson	Hughes, Carol L.
	Washington	Webster, Phyllis
Visalia Unified	Goshen	McFarland, Mary
	Washington	Williamson, Alice G.
TUOLUMNE COUNTY		
Summerville Elementary	Summerville	Pilaria, Beatrice

School District	School	Participant
VENTURA COUNTY		
Nueneme County	Williams	Lawler, Gladys Hughes, Gertrude J.
Pleasant Valley	Dos Caminos	Leach, Kenneth C.
	Las Posas	Wiley, Fred L.
Timber Elementary	Manzanita	Vest, Paul R.
	Walnut	Bullock, Meredith Rokke, David K.
Valley Oaks Union	Glenwood	Bohanon, Robert J. Greenfield, Sylvia
	Horizon Hills	Marking, Dorothy M.
	Meadows	Woodson, Patricia
	Park Oaks	Eden, Barbara
Ventura Unified	Montalvo	Pomatti, Delilah R.
	Mound	Peters, Ann M.
YOLO COUNTY		
Davis Joint Unified	North Davis	Meyer, Carol J.
	Pioneer	Bailey, Irma L.
	Valley Oak	Brakke, Mary McLester, Carol F.
	West Davis	Cox, Ellen
Washington Unified	Norman	Schaffer, Leone
	Evergreen	Westvik, Ardeene J.
YUBA COUNTY		
Marysville Joint Unified	Linda	Daniels, Karin N.
	Covillaud	Pynchon, Kathleen J.

APPENDIX D

MATERIALS USED AND/OR RETAINED BY PARTICIPANTS

Workshop Materials

Manipulative Mathematics Laboratory Materials

Motion Pictures

NAME _____

SECTION _____

PRINTED MATERIALS

			INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
Addison-Wesley Publishing Company, Inc. **2725 Sand Hill Road** **Menlo Park CA 94025**											
2172	Elem. Sch. Math Book, 2, Student	$ 1.65								X	
2173	Elem. Sch. Math Book, 2, Teacher	2.40								X	
2196	Elem. Sch. Math Book, 5, Student	2.97								X	
2197	Elem. Sch. Math Book, 5, Teacher	3.72								X	
1465	Discovery in Math, Student	2.10			X						
1466	Discovery in Math, Teacher	6.00			X						
1467	Explorations in Math, Student	2.25					X				
1468	Explorations in Math, Teacher	6.60					X				
Cuisenaire Company of America, Inc. **12 Church Street** **New Rochelle NY 10805**											
M-7	Notes on Math in Primary Schools	4.95		X							
Encyclopedia Britannica Press **425 North Michigan Avenue** **Chicago IL 60611**											
58014	Math Workshop, Level A	4.80				X					
58024	Math Workshop, Level B	4.80				X					
Herder and Herder **232 Madison Avenue** **New York NY 10016**											
Z80005	Explor. of Space and Practical Measurement	1.95						X			
Z80029	Fractions	2.95						X			
Z80012	Geometry of Distortion	2.50									X
Z80013	Geometry of Congruence	2.25									X
Z80014	Groups and Coordinates	2.95									X
Z80002	Learning Logic, Logical Games	2.45						X			
Z80003	Modern Mathematics for Primary Children	1.00						X			
Z80004	Sets, Numbers, and Powers	1.95						X			

PRINTED MATERIALS

			INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
Houghton Mifflin Company **777 California Avenue** **Palo Alto CA 94304**											
1-14307	Mod. Sch. Math Book, 2, Student	$ 3.60								X	
1-14330	Mod. Sch. Math Book, 2, Teacher	3.16								X	
1-14320	Mod. Sch. Math Book, 5, Student	3.80								X	
1-14333	Mod. Sch. Math Book, 5, Teacher	5.00								X	
2-43725	Experiments in Mathematics, Stage 1	1.20						X			
2-43729	Experiments in Mathematics, Stage 2	1.20						X			
2-43733	Experiments in Mathematics, Stage 3	1.20						X			
John Wiley and Sons, Inc. **605 Third Avenue** **New York NY 10016**											
I Do and I Understand		1.95								X-P	
Mathematics Begins, 1		2.25								X-P	
Computation and Structure, 2		2.50								X-P	
Computation and Structure, 3		2.25								X-P	
Beginnings, 1		2.50								X-P	
Shape and Size, 2		2.50								X-P	
Shape and Size, 3		2.25								X-P	
Pictorial Representations, 1		2.25								X-P	
Webster Division **McGraw-Hill Book Company** **8171 Redwood Highway** **Novato CA 94947**											
18479	Attribute Games Manual	3.84		X							
18480	Attribute Games Problem Cards	5.40						X			
17524	Geo Block Manual	1.92						X			
18417	Mirror Card Manual	2.82						X			
17521	Peas and Particles	2.97						X			
17560	Pattern Block Manual	2.00						X			
17511	The Balance Book	3.00						X			
61131	Operations Games Manual	5.00						X			
18502	Attribute Game Stickers	2.55						X			

PRINTED MATERIALS

		INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
National Council of Teachers of Mathematics 1201 16 Street, N.W. Washington DC 20036										
300-09248 Enrichment Math for the Grades	$ 4.00							X		
300-09274 Topics in Mathematics	4.00							X		
Selective Educational Equipment, Inc. Three Bridge Street Newton MA 02195										
ENGMPS Mathematics in Primary Schools	2.00							X		
GNO893 Practical Maths Workcards	18.75						X			
Silver Burdett Company 435 Middlefield Road Palo Alto CA 94301										
Experiences in Discovery, Level C	.60						X			
Experiences in Discovery, Level D	.60						X			
Math Media Division H & M Associates Post Office Box 1107 Danbury CT 06810										
M111 Mathematics Using String	1.00						X			
A. C. Vroman, Inc. 367 South Pasadena Avenue Pasadena CA 91105										
Probability for Primary Grades, Student	.50						X			
Probability for Primary Grades, Teacher	2.00						X			
Probability for Intermediate Grades, Student	1.00						X			
Probability for Intermediate Grades, Teacher	2.00						X			
Franklin Books - Learning About Measurement	3.09						X			
Franklin Books - Learn to Fold, Fold to Learn	1.98						X			

PRINTED MATERIALS

		INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
A. C. Vroman, Inc. (cont.)										
Franklin Books - Mirror Magic	$ 2.34						X			
Franklin Books - Paper and Pencil Geometry	1.95						X			
Franklin Books - Mathematics Around the Clock	2.55						X			
Franklin Books - Making and Using Graphs and Nomographs	1.95						X			
Franklin Books - Patterns and Puzzles in Math	2.55						X			
Walker Publishing Company 720 Fifth Avenue New York NY 10019										
Inquiry Into Math Via the Geoboard	2.50			X						
Geo Card Math Lab	6.95						X			
Department of Education, San Diego County 6401 Linda Vista Road San Diego CA 92111										
Strands Report, Part I			X							
Strands Report, Part II			X							
Los Angeles Madison Project Cards			X							
San Diego Geoboard Cards			X							
Madison Project Cards			X							
Primary Rulers			X							
Playskool Color Cubes Sheet			X							
Balance Lesson			X							
Beanstick Lesson			X							
Cuisenaire Lesson			X							
Block Sheet (8 1/2" x 13")			X							
Geoboard Book for Primary (Zimmerman)			X							
Dot Paper			X							
Elementary Science Study 55 Chapel Street Newton MA 02160										
Making Maps	.50						X			

PRINTED MATERIALS

		INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
Elementary Science Study (cont.)										
Optics	$ 1.00						X			
Outdoor Mapping	1.00						X			
Whistles and Strings	1.00						X			
Learning Materials Division Responsive Environments Corporation 200 Sylvan Avenue Englewood Cliffs NJ 07632										
106-G-08 Alike/Unlike Books, Set 1	3.00						X			
107-G-08 Alike/Unlike Books, Set 2	3.00						X			
169-T-01 Fraction Dominoes	3.00						X			
170-T-01 Decimal Fraction Dominoes	3.00						X			
105-G-08 Shape Analysis Matching Game	3.00						X			
St. Regis Paper Company Nifty Division Post Office Box 588 Houston TX 77011										
Graph Paper, 11"x 15", 1" Squares	.59								X	
Graph Paper, 11"x 15", 1/2" Squares	.59								X	
Graph Paper, 22"x 30", 1" Squares	1.95								X	
Graph Paper, 22"x 30", 1/2" Squares	1.95								X	
6% Sales Tax and Shipping Costs	5.00		X							

NAME _____

SECTION _____

MANIPULATIVE AIDS

		INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
Cuisenaire Company of America, Inc. 12 Church Street New Rochelle NY 10805										
CX-3E Classroom Kit	$ 2.48		X							
Educational Teaching Aids Division A. Daigger & Company, Inc. 159 West Kinzie Street Chicago IL 60610										
1500 ETA Discovery Blocks	12.00						X			
Herder and Herder 232 Madison Avenue New York NY 10016										
Z80008 Multibase Arithmetic Blocks	99.00						X			
Holt, Rinehart and Winston, Inc. Box 34400, Crocker Park San Francisco CA 94134										
Developing Number Experiences, Kit A	24.00						X			
Lakeshore Equipment Company 6036 Claremont Avenue Oakland CA 94618										
P302 Color Cubes	1.90						X			
La Pine Scientific Company 920 Parker Street Berkeley CA 94710										
Z-5000 La Pine Sage Kit	8.95						X			

MANIPULATIVE AIDS

			INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
La Pine Scientific Company (cont.)											
Z-8863	Hexstat Probability Demonstrator and Teacher's Manual	$ 1.50						X			
Z-0346	Ohaus Student Balance	11.96						X			
13-96 (031)	Spring Scale	2.00						X			
Math Media Division H & M Associates Post Office Box 1107 Danbury CT 06810											
M100	Ascobloc	20.00						X			
M158	Map Measure and Compass	2.20						X			
M160	Madison Project - Independent Exploration Material	16.25						X			
Webster Division McGraw-Hill Book Company 8171 Redwood Highway Novato CA 94947											
17523	Geo Blocks	29.50						X			
184184	Mirror Cards	10.80						X			
174458	Tangram Cards	4.20		X							
174466	Tangram Pieces	2.40		X							
51130	Operations Games	12.00						X			
798967	Attribute Games Materials	9.60		X							
Pickett, Inc. 436 East Gutierrez Street Santa Barbara CA 93102											
N-901-ES	Elementary Slide Rule	4.46						X			

MANIPULATIVE AIDS

			INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
Selective Educational Equipment Inc. **Three Bridge Street** **Newton MA 02193**											
INV100a	Balance with Clips	$ 6.75						X-3			
SEE001	SEE "Calculator"	1.40						X			
AGCK00	Attribute Games and Problems	8.60									
INV250	Clinometer	4.50						X			
GN1159	Geometric Dominoes	1.25						X			
ESA005	Geometric Matching	1.25						X			
GN1046	Geometric Shape Spotting	2.00						X			
TAPE03	Measuring Tape, 15m/50'	5.00						X			
MIRROR	Unbreakable Mirror	3/1.25						X-6			
KPS001	Netting	.10						X			
KPS002	Bucket	.12						X			
KPS003	Balance Stand	1.10						X			
KPS004	Pegboard Beam	.35						X			
PBCK00	Pattern Blocks	10.50						X			
HPR006	Primary Ruler	.15						X-12			
HPY007	Primary Yardstick	1.25						X			
GN1318	Setsplay	3.00						X			
GN1158	Spot the Set	2.00						X			
ARN001	Trundle Wheel	4.50						X			
Sigma Enterprises, Inc. **Box 15485** **Denver CO 80215**											
G-1	Geosquare Classroom Kit	42.00		X							
A. C. Vroman, Inc. **367 South Pasadena Avenue** **Pasadena CA 91105**											
	Spinners for Primary Grades	7.00						X			
	Spinners for Intermediate Grades	7.00						X			

MOTION PICTURES

Source	Film Title
Madison Project 918 Irving Avenue Syracuse NY 13210	Banneker Postman Stories Addition and Multiplication Using Plastic Washers Guessing Functions Introduction to Geometry via Nail Boards Inservice Films, Numbers 1 - 10 (10 reels)

# # # #

Davidson Films 1757 Union Street San Francisco CA 94123	Piaget Classification Piaget Conservation

# # # #

Radim Films 220 West 42nd Street New York NY 10036	I Do, I Understand

# # # #

Foundation Film Library Brooklands House Weybridge Surrey, England	Maths Alive

# # # #

Specialized Teacher Project State Education Building 721 Capitol Mall Sacramento CA 95814	Toward Improving Computation, Numbers 1 - 10 (Dr. Robert Wirtz) (10 reels)